



Course Syllabus

1. Course Title:

Computer Control Technologies

2. Academic Level:

Master

3. ECTS Credits:

5 ECTS

4. Semester:

1, autumn semester

5. School/Department:

Institute of Radio Engineering Systems and Control/ Department of Automatic Control Systems

6. Location:

Taganrog Campus, 44 Nekrasovsky Lane, Taganrog

7. Instructor:

Assoc. Prof. Elena Shestova, email: eashestova@sfedu.ru

8. Language of Instruction:

English

9. Course Description:

In the discipline Computer control technologies, the basics of applying modern computer technologies for transmitting and processing information in the construction of control systems are considered. Practical classes and laboratory work are supported by many examples, allowing students to study in more detail the process of designing automation and control tools and systems using modern application software packages.

10. Course Aims:

Course aims: to study by students of the application of modern computer technologies for the transmission and processing of information in the construction of control systems.

11. Specific entry requirements (if any):

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12. Course Content:

Module 1 Computer control technologies

Course unit №1. Computer technologies of automation and control in technical systems. Computer control technologies in technical systems. Modern technologies for managing technical systems. Hardware and software applications for the development and research of control systems.

Course unit №2. Control systems with the use of industrial controllers LOGO. Getting to know LOGO. LOGO menu structure. Connection and extension modules LOGO. Main functions. Parametrization. Application examples. LOGO configuration.

Course unit №3. LOGO programming languages. LOGO software. LOGO programming. Inputs and outputs, main blocks. Basic logical operations. Basic and special functions in the LOGO! Soft Comfort.

Course unit №4. Control systems with use of industrial controllers S7-200. Basics of the S7-200 PLC. Main functions. S7-200 instruction set. Application examples. PLC S7-200. Data exchange over the network.

Course unit №5. S7-200 programming languages. S7-200 software. S7-200 programming. The main elements of the program. SIMATIC instruction sets. Basic and special functions in the Step 7 - Micro / WIN software package.

13. Intended Learning Outcomes:

After studying this course, the student will receive the following knowledge, skills and abilities.

Knowledge: modern methods of developing automatic and automated control systems; principles of systems approach and systems theory; modern computer technologies and methods of designing automated and automatic control systems; modern methods of development and design of automatic control systems; the principles of building automated and automatic control systems, the main characteristics of data processing systems, standards governing the structure and content of technical specifications; modern methods of constructing algorithms and implementing them using applied programs in the field of computer technologies for automation and control.

Skills: to apply modern theoretical and experimental methods of identification and research of mathematical models of the considered control objects; to apply the methods of scientific knowledge and the principles of identifying control objects; to develop an action strategy in the design of automated and automatic control systems; synthesize and implement laws and control algorithms; to apply modern methods of designing automated and automatic control systems; to apply modern information and computer technologies when creating and researching automatic control systems.

Abilities: the principles of a systematic approach and methods of building control systems; the skills of using applied programs and packages focused on the study of control systems; the skills of using modern software products for the development and research of technical control systems; the skills of designing automated and automatic control systems; the skills of developing methods of automatic and automated control systems and the use of applied programs and packages focused on researching automatic control systems.

14. Learning and Teaching Methods:

Practical classes - visualization using presentation material.

Laboratory classes - are backed up with many examples to allow students to learn more about development of control systems.

Self-study - use of different reference books and Internet resources.

15. Methods of Assessment/Final assessment information:

Current assessment: Performing laboratory work, a written survey, an essay.

Frontier assessment: written assignment.

Final assessment: exam

16. Reading List:

Main reading list.

1. Tretyakov, A. A. Means of control automation: controllers programming systems / A. A. Tretyakov, I. A. Elizarov, V. N. Nazarov; Tambov State Technical University. - Tambov: Tambov State Technical University (TSTU), 2017 .-- 82 p .: ill. - Bibliography: p. 79. - ISBN 978-5-8265-1731-4. - Text: electronic. – URL: <https://biblioclub.ru/index.php?page=book&id=499053>.
2. Malkov S.B., Burkov D.V. Lecture notes for the course "Computer, network and information technologies" (in questions and answers) [Electronic resource]: [for students. 1 year of study Subject area code 13.04.02]. Part 1 / SFedU, IRSU, Dept. E and M. - Taganrog: SFedU Publishing House, 2014 .-- 50 p.. http://ntb.tgn.sfedu.ru/UML/UML_5309.pdf
3. Shishov, OV Modern technologies of industrial automation: textbook / OV Shishov. - Moscow; Berlin: Direct-Media, 2015 .-- 368 p. : ill., table., schemes. - Bibliography: p. 362-364. - ISBN 978-5-4475-5274-9. - DOI 10.23681 / 364093. - Text: electronic – URL: <https://biblioclub.ru/index.php?page=book&id=364093>.

Additional reading list.

1. Sinitsa, P.V. Equipment control systems. Workshop: manual: [12+] / P. V. Sinitsa. - Minsk: RIPO, 2017 .- 84p. : schemes., ill. - Access mode: by subscription. - URL: <https://biblioclub.ru/index.php?page=book&id=463681>. - Bibliography. in the book. - ISBN 978-985-503-659-4. - Text: electronic.
2. Denisenko V.V. Computer control of technological process, experiment, equipment / V.V. Denisenko. - M.: Hot line - Telecom, 2013 .-- 584 p.: Ill. - Bibliography. in the book. - ISBN 978-5-9912-0060-8; The same [Electronic resource]. – URL: <http://biblioclub.ru/index.php?page=book&id=253183>.